						F	EVISI	ONS										
LTR				DES	CRIPTIC	N					DATE (YR-MO-DA)			APPROVED				
А	Char	inges in accordance with NOR 5962-R055-93 JT					JT				92-12-21 Monica L. P			. Poelki	ng			
В	Char	nges in accor	dance wi	ith NOR 5	5962-R02	21-99	- LTG					00-1	0-05		Monica L. Poelking			
С	Modi certif	fy paragraph ication mark.	s 3.1 and Update	d 3.5.1 to boilerpla	allow pro te. – TVI	oduct to N	be ma	arked v	vith "Q	D"		00-1	0-05		Mo	onica L	. Poelki	ng
D	Upda	ate boilerplate	e to MIL-I	PRF-3853	35 requir	ements	. – Cl	FS				05-0	9-07		Т	homas	M. Hes	ss
THE ORIGIN	I JAL FII	RST SHEET	OF THI	S SMD F	HAS BE	EN RE	PLACI	ED.										
REV																		
SHEET																		
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SHEET	15																	
REV STATUS			REV		D	D	D	D	D	D	D	D	D	D	D	D	D	D
OF SHEETS			SHEE	Т	1	2	3	4	5	6	7	8	9	10	11	12	13	14
PMIC N/A			PREP	ARED BY Ray	/ / Monnir	l		-	D	EFEN	SE S DLUN	UPPL IBUS	Y CE	NTER D 432	COL	UMB( 990	JS	
STA	NDA		CHEC	KED BY Da	Di Cenzo	)					http	)://ww	/w.ds	cc.dla	a.mil			
				OVED B	/													
				N. /	A. Hauck			MIC	ROC	IRCU	IT, PF	ROGR	AMM	ABLE	INTE	RVAL	TIME	R,
FOR U DEPAI	THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS		DRAWING APPROVAL DATE 87-06-22			МО	NOLI	THIC	SILIC	ON								
DEPARTMEN	NT OF I	DEFENSE	REVIS	SION LEV	EL			SIZE	4	CAG	E COE	DE <b>B</b>		5962-87520				
AM	SC N/A	۱.			D			SHE	ET	1		OF	<u> </u>	15				

1. SCOPE

1.1 <u>Scope</u>. This drawing describes device requirements for MIL-STD-883 compliant, non-JAN class level B microcircuits in accordance with MIL-PRF-38535, appendix A.

1.2 Part or Identifying Number (PIN). The complete PIN is as shown in the following example:



### 2. APPLICABLE DOCUMENTS

2.1 <u>Government specification, standards, and handbooks</u>. The following specification, standards, and handbooks form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

#### DEPARTMENT OF DEFENSE SPECIFICATION

MIL-PRF-38535 - Integrated Circuits, Manufacturing, General Specification for.

### DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883	-	Test Method Standard Microcircuits.
MIL-STD-1835	-	Interface Standard Electronic Component Case Outlines.

DEPARTMENT OF DEFENSE HANDBOOKS

MIL-HDBK-103	-	List of Standard Microcircuit Drawings.
MIL-HDBK-780	-	Standard Microcircuit Drawings.

(Copies of these documents are available online at <u>http://assist.daps.dla.mil/quicksearch/</u> or <u>http://assist.daps.dla.mil</u> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 <u>Order of precedence</u>. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 <u>Item requirements</u>. The individual item requirements shall be in accordance with MIL-PRF-38535, appendix A for non-JAN class level B devices and as specified herein. Product built to this drawing that is produced by a Qualified Manufacturer Listing (QML) certified and qualified manufacturer or a manufacturer who has been granted transitional certification to MIL-PRF-38535 may be processed as QML product in accordance with the manufacturers approved program plan and qualifying activity approval in accordance with MIL-PRF-38535. This QML flow as documented in the Quality Management (QM) plan may make modifications to the requirements herein. These modifications shall not affect form, fit, or function of the device. These modifications shall not affect the PIN as described herein. A "Q" or "QML" certification mark in accordance with MIL-PRF-38535 is required to identify when the QML flow option is used. This drawing has been modified to allow the manufacturer to use the alternate die/fabrication requirements of paragraph A.3.2.2 of MIL-PRF-38535 or other alternative approved by the Qualifying Activity.

3.2 <u>Design, construction, and physical dimensions</u>. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535, appendix A and herein.

3.2.1 <u>Case outline</u>. The case outline shall be in accordance with 1.2.2 herein.

3.2.2 <u>Terminal connections</u>. The terminal connections shall be as specified on figure 1.

3.2.3 <u>Truth tables</u>. The truth tables shall be as specified on figure 2.

3.2.4 Block diagram. The block diagram shall be as specified on figure 3.

3.2.5 <u>Timing waveforms</u>. The timing waveforms shall be as specified on figures 4 and 5.

3.3 <u>Electrical performance characteristics</u>. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full case operating temperature range.

3.4 <u>Electrical test requirements</u>. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

STANDARD	SIZE		5962-87520
	Α		3902-07320
DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43218-3990		REVISION LEVEL D	SHEET 3

3.5 <u>Marking</u>. Marking shall be in accordance with MIL-PRF-38535, appendix A. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked. For packages where marking of the entire SMD PIN number is not feasible due to space limitations, the manufacturer has the option of not marking the "5962-" on the device.

3.5.1 <u>Certification/compliance mark</u>. A compliance indicator "C" shall be marked on all non-JAN devices built in compliance to MIL-PRF-38535, appendix A. The compliance indicator "C" shall be replaced with a "Q" or "QML" certification mark in accordance with MIL-PRF-38535 to identify when the QML flow option is used. For product built in accordance with A.3.2.2 of MIL-PRF-38535, or as modified in the manufacturer's QM plan, the "QD" certification mark shall be used in place of the "Q" or "QML" certification mark.

3.6 <u>Certificate of compliance</u>. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-HDBK-103 (see 6.7 herein). The certificate of compliance submitted to DSCC-VA prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-PRF-38535, appendix A and the requirements herein.

3.7 <u>Certificate of conformance</u>. A certificate of conformance as required in MIL-PRF-38535, appendix A shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DSCC-VA shall be required for any change that affects this drawing.

3.9 <u>Verification and review</u>. DSCC, DSCC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

STANDARD MICROCIRCUIT DRAWING	SIZE A		5962-87520
DEFENSE SUPPLY CENTER COLUMBUS		REVISION LEVEL	SHEET
COLUMBUS, OHIO 43218-3990		D	4

		TABLE I. Electrical perfo	ormance cha	racteristics	<u>3</u> .			
Test	$\begin{tabular}{ c c c c } \hline Symbol & Conditions \\ -55^\circ C \leq T_C \leq +125 \end{tabular}$		25°C type		Group A subgroups	Liı	Unit	
		$4.5 \text{ V} \le \text{V}_{\text{CC}} \le 5.5$ unless otherwise spe	5 V ecified			Min	Max	
Input low voltage	V <sub>IL</sub>	V <sub>CC</sub> = 5 V ±10%		All	1, 2, 3		0.7	V
Input high voltage	V <sub>IH</sub>	V <sub>CC</sub> = 5 V ±10%		All	1, 2, 3	2.2		V
Output low voltage	V <sub>OL</sub>	$V_{CC} = 5 \text{ V} \pm 10\%, I_{OL} = 1.0$	6 mA	All	1, 2, 3		0.45	V
Output high voltage	V <sub>OH</sub>	$V_{CC} = 5 \text{ V} \pm 10\%, I_{OH} = -1$	50 μΑ	All	1, 2, 3	2.4		V
Input load current	IIL	$V_{CC} = 5.5 V$ $V_{IN} = V_{CC} \text{ to } 0.0 V$		All	1, 2, 3		±20	μA
Output float leakage	I <sub>OFL</sub>	$V_{CC} = 5.5 V$ $V_{OUT} = V_{CC}$ to 0.0 V		All	1, 2, 3		±20	μΑ
V <sub>CC</sub> supply current <u>1</u> /	I <sub>cc</sub>	V <sub>CC</sub> = 5.5 V Outputs unloaded static		All	1, 2, 3		160	mA
Input capacitance	C <sub>IN</sub>	$f_c = 1 \text{ MHz}, T_A = 25^{\circ}\text{C}$ $V_{CC} = \text{GND} = 0.0 \text{ V}$ See 4.3.1d		All	4		10	pF
Input/Output capacitance	C <sub>I/O</sub>	$T_A = 25^{\circ}C$ $V_{CC} = GND = 0.0 V$ Unmeasured pins returned See 4.3.1d	ed to V <sub>SS</sub>	All	4		20	pF
Functional test		See 4.3.1c		All	7, 8			
Address stable before	t <sub>AR</sub>	See figures 4 and 5 $\underline{2}$		01, 02	9, 10, 11	50		ns
RD				03		30		
Address hold time for RD	t <sub>RA</sub>			All	9, 10, 11	5		ns
RD pulse width <u>3</u> /	t <sub>RR</sub>			01, 02	9, 10, 11	400		ns
				03		300		
Data delay from RD <u>4</u> /	t <sub>RD</sub>			01, 02	9, 10, 11		300	ns
				03			200	
RD to data floating <u>5</u> /	t <sub>DF</sub>			01, 02	9, 10, 11	25	125	ns
				03		25	100	
Recovery time between RD and any other control signal <u>5</u> /	t <sub>RV</sub>			All	9, 10, 11	1		μS
See footnotes at end of tab	le.							
STA			SIZE				5962-5	87520

STANDARD MICROCIRCUIT DRAWING	512E <b>A</b>		5962-8
DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43218-3990		REVISION LEVEL D	SHEET 5

TABLE I. Electrical performance characteristics - Continued.									
Test Symbol		Conditions -55°C $\leq$ T <sub>C</sub> $\leq$ +125°C	Device Group type subgrou		Lin	Unit			
		4.5 V $\leq$ V <sub>CC</sub> $\leq$ 5.5 V unless otherwise specified			Min	Max			
Address stable before	t <sub>AW</sub>	See figures 4 and 5 2/	01, 02	9, 10, 11	50		ns		
WR			03		30				
Address hold time for $\overline{WR}$	t <sub>WA</sub>		All	9, 10, 11	30		ns		
WR pulse width <u>3</u> /	t <sub>WW</sub>		01, 02	9, 10, 11	400		ns		
. –			03		300				
Data setup time for	t <sub>DW</sub>		01, 02	9, 10, 11	300		ns		
WR			03		250		-		
Data hold time for	t <sub>WD</sub>		01, 02	9, 10, 11	40		ns		
WR			03		30				
Recovery time between WR and any other control signal <u>5</u> /	t <sub>RV</sub>		All	9, 10, 11	1		μs		
Clock period	t <sub>CLK</sub>		All	9, 10, 11	380	DC <u>5</u> /	ns		
High pulse width	t <sub>PWH</sub>		All	9, 10, 11	230		ns		
Low pulse width	t <sub>PWL</sub>		All	9, 10, 11	150		ns		
Gate width high	t <sub>GW</sub>		All	9, 10, 11	150		ns		
Gate width low <u>5</u> /	t <sub>GL</sub>		All	9, 10, 11	100		ns		
Gate setup to CLK high	t <sub>GS</sub>		All	9, 10, 11	100		ns		
Gate hold after CLK high	t <sub>GH</sub>		All	9, 10, 11	55		ns		
Output delay from CLK low <u>4</u> /	t <sub>OD</sub>		All	9, 10, 11		400	ns		
Output delay from gate low <u>4</u> /	t <sub>ODG</sub>		All	9, 10, 11		300	ns		

 $\underline{1}$  I<sub>CC</sub> is measured in a static condition with no output loads applied.

 $\underline{2}/$  Test conditions: V<sub>IL</sub> = 0.45 V, V<sub>IH</sub> = 2.4 V V<sub>OL</sub> = 0.8 V, V<sub>OH</sub> = 2.2 V

3/ If clock low occurs less than 100 ns after the rising edge of READ or WRITE, the counter selected during the READ or WRITE could be affected.

 $\underline{4}$ / Test condition: C<sub>L</sub> = 100 pF.

5/ Guaranteed if not tested.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		5962-87520
		REVISION LEVEL D	SHEET 6

Device type	All						
Case outline		J					
Terminal number	Terminal symbol	Terminal number	Terminal symbol				
1	D7	13	OUT1				
2	D6	14	GATE1				
3	D5	15	CLK1				
4	D4	16	GATE2				
5	D3	17	OUT2				
6	D2	18	CLK2				
7	D1	19	A0				
8	D0	20	A1				
9	CLK0	21	CS				
10	OUT0	22	RD				
11	GATE0	23	WR				
12	GND	24	V <sub>cc</sub>				

FIGURE 1. Terminal connections.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43218-3990	SIZE A		5962-87520
		REVISION LEVEL D	SHEET 7

CS	RD	WR	A1	A0	
0	1	0	0	0	Load counter number 0
0	1	0	0	1	Load counter number 1
0	1	0	1	0	Load counter number 2
0	1	0	1	1	Write mode word
0	0	1	0	0	Read counter number 0
0	0	1	0	1	Read counter number 1
0	0	1	1	0	Read counter number 2
0	0	1	1	1	No-operation three-state
1	Х	Х	Х	Х	Disable three-state
0	1	1	Х	Х	No-operation three-state

## Mode register for latching count

### A0, A1 = 11

D7	D6	D5	D4	D3	D2	D1	D0
SC1	SC0	0	0	Х	Х	Х	Х

SC1, SC0-Specify counter to be latched.D5, D4-00 designates counter latching operation.X-Don't care.

Control word format

D7	D6	D5	D4	D3	D2	D1	D0
SC1	SC0	RL1	RL0	M2	M1	M0	BCD

FIGURE 2. Truth tables.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43218-3990	SIZE A		5962-87520
		REVISION LEVEL D	SHEET 8

Definition of control

## SC - Select counter

SC1	SC0	
0	0	Select counter 0
0	1	Select counter 1
1	0	Select counter 2
1	1	Illegal

## RL - Read/Load

RL1	RL0	
0	0	Counter latching operation
1	0	Read/load most significant byte only
0	1	Read/load least significant byte only
1	1	Read/load least significant byte first, then most significant byte

### M - Mode

M2	M1	MO	
0	0	0	Mode 0
0	0	1	Mode 1
Х	1	0	Mode 2
Х	1	1	Mode 3
1	0	0	Mode 4
1	0	1	Mode 5

## FIGURE 2. Truth tables - Continued.

STANDARD MICROCIRCUIT DRAWING	SIZE <b>A</b>		5962-87520
DEFENSE SUPPLY CENTER COLUMBUS		REVISION LEVEL	SHEET
COLUMBUS, OHIO 43218-3990		D	9

в	(	2	D
-	•	-	-

0	Binary counter 16-bits
1	Binary code decimal (BCD) counter (4 decades)

### Gate pin operations summary

Modes	Signal status				
widdes	Low or going low	Rising	High		
0	Disables counting	-	Enables counting		
1	-	<ol> <li>Initiates counting</li> <li>Resets output after next clock</li> </ol>	-		
2	<ol> <li>Disables counting</li> <li>Sets output immediately high</li> </ol>	<ol> <li>Reloads counter</li> <li>Initiates counting</li> </ol>	Enables counting		
3	<ol> <li>Disables counting</li> <li>Sets output immediately high</li> </ol>	Initiates counting	Enables counting		
4	Disables counting	-	Enables counting		
5	-	Initiates counting	-		

# FIGURE 2. Truth tables - Continued.

STANDARD MICROCIRCUIT DRAWING	SIZE A		5962-87520
DEFENSE SUPPLY CENTER COLUMBUS		REVISION LEVEL	SHEET
COLUMBUS, OHIO 43218-3990		D	10





### 4. VERIFICATION

4.1 <u>Sampling and inspection</u>. Sampling and inspection procedures shall be in accordance with MIL-PRF-38535, appendix A.

4.2 <u>Screening</u>. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

- a. Burn-in test, method 1015 of MIL-STD-883.
  - (1) Test condition D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1015 of MIL-STD-883.
  - (2)  $T_A = +125^{\circ}C$ , minimum.
- b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

MIL-STD-883 test requirements	Subgroups (in accordance with MIL-STD-883, method 5005, table I)
Interim electrical parameters (method 5004)	
Final electrical test parameters (method 5004)	1*, 2, 3, 7, 8, 9, 10, 11
Group A test requirements (method 5005)	1*, 2, 3, 7, 8, 9, 10, 11
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3 or 2, 8A, 10
Additional electrical subgroups for group C periodic inspections	

TABLE II. Electrical test requirements.

\* PDA applies to subgroup 1.

4.3 <u>Quality conformance inspection</u>. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

- 4.3.1 Group A inspection.
  - a. Tests shall be as specified in table II herein.
  - b. Subgroups 5 and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.
  - c. Subgroups 7 and 8 are verified by testing to the truth tables in figure 2.
  - d. Subgroup 4 (C<sub>IN</sub> and C<sub>I/O</sub> measurements) shall be measured initially and after process or design changes which may affect capacitance.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43218-3990	SIZE A		5962-87520
		REVISION LEVEL D	SHEET 13

#### 4.3.2 Groups C and D inspections.

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test conditions, method 1005 of MIL-STD-883.
  - (1) Test condition D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1005 of MIL-STD-883.
  - (2)  $T_A = +125^{\circ}C$ , minimum.
  - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

### 5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38535, appendix A.

### 6. NOTES

6.1 <u>Intended use</u>. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

6.2 <u>Replaceability</u>. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 <u>Configuration control of SMD's</u>. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished using DD Form 1692, Engineering Change Proposal.

6.4 <u>Record of users</u>. Military and industrial users shall inform Defense Supply Center Columbus (DSCC) when a system application requires configuration control and the applicable SMD. DSCC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DSCC-VA, telephone (614) 692-0525.

6.5 <u>Comments</u>. Comments on this drawing should be directed to DSCC-VA, Columbus, Ohio 43218-3990, or telephone (614) 692-0547.

6.6 <u>Abbreviations, symbols, and definitions</u>. The abbreviations, symbols, and definitions used herein are defined in MIL-PRF-38535, MIL-HDBK-1331, and table III herein.

6.7 <u>Approved sources of supply</u>. Approved sources of supply are listed in MIL-HDBK-103. The vendors listed in MIL-HDBK-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DSCC-VA.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		5962-87520
		REVISION LEVEL D	SHEET 14

TABLE III.	Pin description.

Pin number	Name	Input/Output	Description
1 – 8	D7 – D0	I/O	Data bus (8-bit)
9, 15, 18	CLK N	I	Counter clock inputs
11, 14, 16	GATE N	I	Counter gate inputs
10, 13, 17	OUT N	0	Counter outputs
22	RD	I	Read counter
23	WR	I	Write command or data
21	CS	I	Chip select
19, 20	A0, A1	I	Counter select
24	V <sub>CC</sub>		+5 volts
12	GND		Ground

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		5962-87520
		REVISION LEVEL D	SHEET 15

#### STANDARD MICROCIRCUIT DRAWING BULLETIN

#### DATE: 05-09-07

Approved sources of supply for SMD 5962-87520 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and/or QML-38535 during the next revision. MIL-HDBK-103 and/or QML-38535 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DSCC-VA. This information bulletin is superseded by the next dated revision of MIL-HDBK-103 and/or QML-38535. DSCC maintains an online database of all current sources of supply at http://www.dscc.dla.mil/Programs/Smcr/.

Standard microcircuit drawing PIN <u>1</u> /	Vendor CAGE number	Vendor similar PIN <u>2</u> /
5962-8752001JA	<u>3</u> /	8253
5962-8752002JA	3V146	MD8253/BJA
5962-8752003JA	<u>3</u> /	8253-5

- 1/ The lead finish shown for each PIN representing a hermetic package is the most readily available from the manufacturer listed for that part. If the desired lead finish is not listed contact the vendor to determine its availability.
- <u>2</u>/ <u>Caution</u>. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.
- 3/ Not available from an approved source of supply.

Vendor CAGE number Vendor name and address

3V146

Rochester Electronics 10 Malcolm Hoyt Drive Newburyport, MA 01950

The information contained herein is disseminated for convenience only and the Government assumes no liability whatsoever for any inaccuracies in the information bulletin.